

## 1

## SEQUENCE LISTING

<110> University of Medicine and Dentistry of New Jersey  
Kaplan, Jeffrey B.

<120> Compositions and Methods for Enzymatic Detachment of Bacterial  
and Fungal Biofilms

<130> UMD-0015

<150> US 60/435,817

<151> 2002-12-20

<160> 15

<170> PatentIn version 3.1

<210> 1

<211> 1146

<212> DNA

<213> Actinobacillus actinomycetemcomitans strain CU1000N

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ttaatgctgg acatcgcccg acatttttat tcacccgagg tgattaaatc ctttattgat	180
accatcagcc tttccggcgg taattttctg cacctgcatt tttccgacca tgaaaactat	240
gcgatagaaa gccatttact taatcaacgt gcggaaaatg ccgtgcaggg caaagacggt	300
atztatatta atccttatac cggaaagcca ttcttgagtt atcggcaact tgacgatatc	360
aaagcctatg ctaaggcaaa aggcattgag ttgattcccg aacttgacag cccgaatcac	420
atgacggcga tcttttaaact ggtgcaaaaa gacagagggg tcaagtacct tcaaggatta	480
aaatcacgcc aggtagatga tgaaattgat attactaatg ctgacagtat tacttttatg	540
caatctttta tgagtgaggt tattgatatt tttggcgaca cgagtcagca ttttcatatt	600
ggtggcgatg aatttggtta ttctgtggaa agtaatcatg agtttattac gtatgccaat	660
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gagttgctgg cgaaaggctt tactgtcctg aactataatt cctattatct ttacattggt	900
ccgaaagctt caccaacctt ctgcgaagat gccgcctttg ccgcaaaga tggtataaaa	960
aattgggatc ttggtgtttg ggatggacga aacacaaaaa accgcgtaca aaatactcat	1020
gaaatagccg gcgcagcatt atcgatctgg ggagaagatg caaaagcgct gaaagacgaa	1080
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2

gagtga

1146

&lt;210&gt; 2

&lt;211&gt; 381

&lt;212&gt; PRT

&lt;213&gt; Actinobacillus actinomycetemcomitans strain CU1000N

&lt;400&gt; 2

Met Asn Tyr Ile Lys Lys Ile Ile Leu Ser Leu Phe Leu Leu Gly Leu  
 1 5 10 15

Phe Ser Val Leu Asn Cys Cys Val Lys Gly Asn Ser Ile Tyr Pro Gln  
 20 25 30

Lys Thr Ser Thr Lys Gln Thr Gly Leu Met Leu Asp Ile Ala Arg His  
 35 40 45

Phe Tyr Ser Pro Glu Val Ile Lys Ser Phe Ile Asp Thr Ile Ser Leu  
 50 55 60

Ser Gly Gly Asn Phe Leu His Leu His Phe Ser Asp His Glu Asn Tyr  
 65 70 75 80

Ala Ile Glu Ser His Leu Leu Asn Gln Arg Ala Glu Asn Ala Val Gln  
 85 90 95

Gly Lys Asp Gly Ile Tyr Ile Asn Pro Tyr Thr Gly Lys Pro Phe Leu  
 100 105 110

Ser Tyr Arg Gln Leu Asp Asp Ile Lys Ala Tyr Ala Lys Ala Lys Gly  
 115 120 125

Ile Glu Leu Ile Pro Glu Leu Asp Ser Pro Asn His Met Thr Ala Ile  
 130 135 140

Phe Lys Leu Val Gln Lys Asp Arg Gly Val Lys Tyr Leu Gln Gly Leu  
 145 150 155 160

Lys Ser Arg Gln Val Asp Asp Glu Ile Asp Ile Thr Asn Ala Asp Ser  
 165 170 175

Ile Thr Phe Met Gln Ser Leu Met Ser Glu Val Ile Asp Ile Phe Gly  
 180 185 190

Asp Thr Ser Gln His Phe His Ile Gly Gly Asp Glu Phe Gly Tyr Ser  
 195 200 205

3

Val Glu Ser Asn His Glu Phe Ile Thr Tyr Ala Asn Lys Leu Ser Tyr  
 210 215 220

Phe Leu Glu Lys Lys Gly Leu Lys Thr Arg Met Trp Asn Asp Gly Leu  
 225 230 235 240

Ile Lys Asn Thr Phe Glu Gln Ile Asn Pro Asn Ile Glu Ile Thr Tyr  
 245 250 255

Trp Ser Tyr Asp Gly Asp Thr Gln Asp Lys Asn Glu Ala Ala Glu Arg  
 260 265 270

Arg Asp Met Arg Val Ser Leu Pro Glu Leu Leu Ala Lys Gly Phe Thr  
 275 280 285

Val Leu Asn Tyr Asn Ser Tyr Tyr Leu Tyr Ile Val Pro Lys Ala Ser  
 290 295 300

Pro Thr Phe Ser Gln Asp Ala Ala Phe Ala Ala Lys Asp Val Ile Lys  
 305 310 315 320

Asn Trp Asp Leu Gly Val Trp Asp Gly Arg Asn Thr Lys Asn Arg Val  
 325 330 335

Gln Asn Thr His Glu Ile Ala Gly Ala Ala Leu Ser Ile Trp Gly Glu  
 340 345 350

Asp Ala Lys Ala Leu Lys Asp Glu Thr Ile Gln Lys Asn Thr Lys Ser  
 355 360 365

Leu Leu Glu Ala Val Ile His Lys Thr Asn Gly Asp Glu  
 370 375 380

&lt;210&gt; 3

&lt;211&gt; 555

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus ligniersii strain 19393

&lt;400&gt; 3

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gagaaaaacg gaacctatct caatccgaaa acaaataagc cgtttctcac ttataaacag 120

ctcaatgaaa ttatctatta tgccaaagaa cgaaatattg aaattgtgcc tgaagtcgat 180

agcccgaatc atatgacggc gatttttgat cttttaaccc ttaagcacgg taaggagtat 240

gtgaaagggc tgaaatcgcc ttatcttgcc gaggaaatcg atattaataa ccctgaagcg 300

4

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gttgaaatta tcaaacctt aatcggtgaa gtgatttata tttttgggca ttccagccga      360
cactttcata tccggcggaga cgaatttagt tatgcggtcg aaaacaatca cgaatttatt      420
cgttatgtaa atacgctaaa tgactttatt aataacaaag gactaattac ccgtatttgg      480
aacgacgggt tgattaaaaa caattttaa gagcttaatc ggaatatcga aattacttat      540
tgagactacg acggt                                         555

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&lt;210&gt; 4

&lt;211&gt; 185

&lt;212&gt; PRT

&lt;213&gt; Actinobacillus ligniersii strain 19393

&lt;400&gt; 4

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Asp His Glu Asn Tyr Ala Leu Glu Ser Ser Tyr Leu Glu Gln Arg Glu
1              5              10              15

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Glu Asn Ala Val Glu Lys Asn Gly Thr Tyr Phe Asn Pro Lys Thr Asn
                20              25              30

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```

Lys Pro Phe Leu Thr Tyr Lys Gln Leu Asn Glu Ile Ile Tyr Tyr Ala
35              40              45

```

```

Lys Glu Arg Asn Ile Glu Ile Val Pro Glu Val Asp Ser Pro Asn His
50              55              60

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Met Thr Ala Ile Phe Asp Leu Leu Thr Leu Lys His Gly Lys Glu Tyr
65              70              75              80

```

```

Val Lys Gly Leu Lys Ser Pro Tyr Leu Ala Glu Glu Ile Asp Ile Asn
85              90              95

```

```

Asn Pro Glu Ala Val Glu Ile Ile Lys Thr Leu Ile Gly Glu Val Ile
100             105             110

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```

Tyr Ile Phe Gly His Ser Ser Arg His Phe His Ile Gly Gly Asp Glu
115             120             125

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```

Phe Ser Tyr Ala Val Glu Asn Asn His Glu Phe Ile Arg Tyr Val Asn
130             135             140

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Thr Leu Asn Asp Phe Ile Asn Asn Lys Gly Leu Ile Thr Arg Ile Trp
145             150             155             160

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```

Asn Asp Gly Leu Ile Lys Asn Asn Leu Asn Glu Leu Asn Arg Asn Ile
165             170             175

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5

Glu Ile Thr Tyr Trp Ser Tyr Asp Gly  
180 185

&lt;210&gt; 5

&lt;211&gt; 558

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus actinomycetemcomitans strain IDH781

&lt;400&gt; 5

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cagggcaaag acggtattta tattaatcct tataccggaa agccattctt gagttatcga 120  
caacttgacg atataaaagc ctatgctaag gcaaaaggca ttgagttgat tcccgaactt 180  
gatagtccga atcacatgac ggcgatcttt aaactggtgc aaaaagacag agggatcaag 240  
tatcttcaag gattaaaatc acgccaggta gatgatgaaa ttgatattac taatgctgac 300  
agtattgctt ttatgcaatc tttaatgagt gaggttattg atatttttgg cgacacgagt 360  
cagcatcttc atattggtgg cgatgaattt gggtattctg tggaaagtaa tcatgagttt 420  
attacgtatg ccaataaact atcctacttt ttagagaaaa aggggttgaa aaccggaatg 480  
tggaatgacg gattaattaa aagtactttt gagcaaatca acccgaatat tgaaattact 540  
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&lt;210&gt; 6

&lt;211&gt; 186

&lt;212&gt; PRT

&lt;213&gt; Actinobacillus actinomycetemcomitans strain IDH781

&lt;400&gt; 6

Asp His Glu Asn Tyr Ala Ile Glu Ser His Leu Leu Asn Gln Arg Ala  
1 5 10 15

Glu Asn Ala Val Gln Gly Lys Asp Gly Ile Tyr Ile Asn Pro Tyr Thr  
20 25 30

Gly Lys Pro Phe Leu Ser Tyr Arg Gln Leu Asp Asp Ile Lys Ala Tyr  
35 40 45

Ala Lys Ala Lys Gly Ile Glu Leu Ile Pro Glu Leu Asp Ser Pro Asn  
50 55 60

His Met Thr Ala Ile Phe Lys Leu Val Gln Lys Asp Arg Gly Ile Lys  
65 70 75 80

Tyr Leu Gln Gly Leu Lys Ser Arg Gln Val Asp Asp Glu Ile Asp Ile  
85 90 95

Thr Asn Ala Asp Ser Ile Ala Phe Met Gln Ser Leu Met Ser Glu Val  
 100 105 110

Ile Asp Ile Phe Gly Asp Thr Ser Gln His Phe His Ile Gly Gly Asp  
 115 120 125

Glu Phe Gly Tyr Ser Val Glu Ser Asn His Glu Phe Ile Thr Tyr Ala  
 130 135 140

Asn Lys Leu Ser Tyr Phe Leu Glu Lys Lys Gly Leu Lys Thr Arg Met  
 145 150 155 160

Trp Asn Asp Gly Leu Ile Lys Ser Thr Phe Glu Gln Ile Asn Pro Asn  
 165 170 175

Ile Glu Ile Thr Tyr Trp Ser Tyr Asp Gly  
 180 185

<210> 7  
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 <212> DNA  
 <213> Haemophilus aphrophilus strain NJ8700

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 cagttggatg acattaaagc atatgcaaaa ttaaaaggta ttgagcttat tcccgaatta 180  
 gatagccoga atcacatgac agcgattttt accttattaa aaaaagaaaa aggaaaaaat 240  
 tatcttcaat cggttaaaatc accacaaaat gatgaggaaa ttagcattac caatccggac 300  
 agcattgcat ttatgcaatc cttattaaca gaggtaattc atacctttgg cgatagcacc 360  
 aagcattttc atattggcgg agatgagttt gggttatgatg aaaatagtaa tcatgaatth 420  
 attacctatg ccaataaatt ggctgattht ttaagagaaa aaggattaaa aactcgaatt 480  
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 tactggagtt acgacggc 558

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 <211> 186  
 <212> PRT  
 <213> Haemophilus aphrophilus strain NJ8700

<400> 8

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Glu Asn Ala Ile Leu Asn Lys Asn Gly Ile Tyr Ile Asn Pro Tyr Thr	20	25	30
Asn Lys Pro Phe Leu Ser Tyr Gln Gln Leu Asp Asp Ile Lys Ala Tyr	35	40	45
Ala Lys Leu Lys Gly Ile Glu Leu Ile Pro Glu Leu Asp Ser Pro Asn	50	55	60
His Met Thr Ala Ile Phe Thr Leu Leu Lys Lys Glu Lys Gly Lys Asn	65	70	75
Tyr Leu Gln Ser Leu Lys Ser Pro Gln Asn Asp Glu Glu Ile Ser Ile	85	90	95
Thr Asn Pro Asp Ser Ile Ala Phe Met Gln Ser Leu Leu Thr Glu Val	100	105	110
Ile His Thr Phe Gly Asp Ser Thr Lys His Phe His Ile Gly Gly Asp	115	120	125
Glu Phe Gly Tyr Asp Glu Asn Ser Asn His Glu Phe Ile Thr Tyr Ala	130	135	140
Asn Lys Leu Ala Asp Phe Leu Arg Glu Lys Gly Leu Lys Thr Arg Ile	145	150	155
Trp Asn Asp Gly Leu Ile Lys Asn Thr Ile Asp Gln Leu Asn Pro Asn	165	170	175
Ile Glu Ile Thr Tyr Trp Ser Tyr Asp Gly	180	185	

&lt;210&gt; 9

&lt;211&gt; 555

&lt;212&gt; DNA

&lt;213&gt; Actinobacillus pleuropneumoniae strain IA5

&lt;400&gt; 9

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gagaaaaacg gaacctatctt caatccgaaa acaaataagc cgtttctcac ttataaacag 120

ctcaatgaaa ttatctatta tgccaaagaa cgaaatattg aaattgtgcc tgaagtcgat 180

agccccgaatc atatgacggc gatttttgat cttttaaccc ttaagcacgg aaaggaatac 240

8

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catttccata tcggcggaga tgaatttagc tatgcggtcg aaaataatca tgaatttatt      420
cggatatgtga ataccttaaa tgattttatc aattccaaag ggctaattac ccgtgtttgg      480
aatgacgggt tgatcaaaaa caacttaagc gaactcaata aaaacattga aatcacttac      540
tggagctacg acggt                                                    555

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&lt;210&gt; 10

&lt;211&gt; 185

&lt;212&gt; PRT

&lt;213&gt; Actinobacillus pleuropneumoniae strain IA5

&lt;400&gt; 10

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Asp His Glu Asn Tyr Ala Leu Glu Ser Ser Tyr Leu Glu Gln Arg Glu
1              5              10              15

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Glu Asn Ala Thr Glu Lys Asn Gly Thr Tyr Phe Asn Pro Lys Thr Asn
20              25              30

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Lys Pro Phe Leu Thr Tyr Lys Gln Leu Asn Glu Ile Ile Tyr Tyr Ala
35              40              45

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```

Lys Glu Arg Asn Ile Glu Ile Val Pro Glu Val Asp Ser Pro Asn His
50              55              60

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Met Thr Ala Ile Phe Asp Leu Leu Thr Leu Lys His Gly Lys Glu Tyr
65              70              75              80

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Val Lys Gly Leu Lys Ser Pro Tyr Ile Ala Glu Glu Ile Asp Ile Asn
85              90              95

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```

Asn Pro Glu Ala Val Glu Val Ile Lys Thr Leu Ile Gly Glu Val Ile
100             105             110

```

```

Tyr Ile Phe Gly His Ser Ser Arg His Phe His Ile Gly Gly Asp Glu
115             120             125

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Phe Ser Tyr Ala Val Glu Asn Asn His Glu Phe Ile Arg Tyr Val Asn
130             135             140

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Thr Leu Asn Asp Phe Ile Asn Ser Lys Gly Leu Ile Thr Arg Val Trp
145             150             155             160

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Asn Asp Gly Leu Ile Lys Asn Asn Leu Ser Glu Leu Asn Lys Asn Ile

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9

165

170

175

Glu Ile Thr Tyr Trp Ser Tyr Asp Gly  
180 185

<210> 11  
<211> 12  
<212> PRT  
<213> A. actinomycetemcomitans

<220>  
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<223> X=any amino acid

<400> 11

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<210> 12  
<211> 17  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Synthetic

<400> 12  
gaycaygara aytaycg

17

<210> 13  
<211> 17  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Synthetic

<220>  
<221> misc\_feature  
<222> (3)..(3)  
<223> n=a, c, g or t

<400> 13  
tcncrtrcrt arctcca

17

<210> 14  
<211> 36  
<212> DNA  
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<220>  
<223> Synthetic

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<400> 14  
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<210> 15  
<211> 33  
<212> DNA  
<213> Artificial sequence

<220>  
<223> Synthetic

<400> 15  
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